CLAIMS

What is claimed is:

1. A method for decoding a signal encoded with a trellis code corresponding to a trellis diagram having a plurality of states, the method comprising:

computing a node metric for each of the plurality of states;

computing a set of conditional optimal symbol sequences leading to all possible current states;

selecting a state having the smallest node metric, as a current optimal state;

selecting an optimal symbol sequence from the computed set of conditional optimal symbol sequences, wherein the selected optimal symbol sequence ends at the selected current optimal state; and

outputting the optimal symbol sequence as a decoded signal.

2. The method of claim 1 further comprising computing branch metrics for each incoming branches such that each branch metric represents a distance between a received signal and a symbol associated with a corresponding branch.

3. The method of claim 2 wherein each of the branch metrics being represented by fewer bits than a squared Euclidian metric representation of said distance.

4. The method of claim 2 wherein the computing a node metric comprises computing a node metric based on corresponding branch metrics and selecting one of the incoming branches associated with a corresponding state, for each of the plurality of states.

5. The method of claim 2 further comprising storing symbols associated with the selected incoming branches corresponding to the plurality of states, in a memory.

6. The method of claim 2 wherein each of the branch metrics is greater than zero.

7. The method of claim 2 wherein at least one of the branch metrics is equal to zero.

8. A system for decoding a received signal encoded with a trellis code corresponding to a trellis diagram having a plurality of states comprising:

a node metric module for computing a node metric for each of the plurality of states;

a path memory module for computing a set of conditional optimal symbol sequences leading to all possible current states; and

a node select module for selecting a state having the smallest node metric, as a current optimal state, wherein the path memory module selects a conditional optimal symbol sequence from the computed set of conditional optimal symbol sequences that ends at the selected current optimal state, as an optimal symbol sequence and outputs the optimal symbol sequence as a decoded signal.

9. The system of claim 8 further comprising a branch metric module for computing branch metrics for each incoming branches such that each branch metric represents a distance between a received signal and a symbol associated with a corresponding branch.

10. The system of claim 9 wherein each of the branch metrics being represented by fewer bits than a squared Euclidian metric representation of said distance.

11. The system of claim 9 wherein the node metric module computes a node metric based on corresponding branch metrics and selects one of the incoming branches associated with a corresponding state, for each of the plurality of states.

12. The system of claim 9 further comprising a memory for storing symbols associated with the selected incoming branches corresponding to the plurality of states.

13. The system of claim 9 wherein each of the branch metrics is greater than zero.

14. The system of claim 9 wherein at least one of the branch metrics is equal to zero.

15. A system for decoding a signal encoded with a trellis code corresponding to a trellis diagram having a plurality of states comprising:

means for computing a node metric for each of the plurality of states;

means for computing a set of conditional optimal symbol sequences leading to all possible current states;

means for selecting a state having the smallest node metric, as a current optimal state;

means for selecting an optimal symbol sequence from the computed set of conditional optimal symbol sequences, wherein the selected optimal symbol sequence ends at the selected current optimal state; and

means for outputting the optimal symbol sequence as a decoded signal.

16. The system of claim 15 further comprising computing branch metrics for each incoming branches such that each branch metric represents a distance between a received signal and a symbol associated with a corresponding branch.

17. The system of claim 16 wherein each of the branch metrics being represented by fewer bits than a squared Euclidian metric representation of said distance.

18. The system of claim 16 wherein the computing a node metric comprises computing a node metric based on corresponding branch metrics and selecting one of the incoming branches associated with a corresponding state, for each of the plurality of states.

19. The system of claim 16 further comprising storing symbols associated with the selected incoming branches corresponding to the plurality of states, in a memory.

20. The system of claim 16 wherein at least one of the branch metrics is greater than zero.